Basin Modeling Technique Value in South Melut Sub Basin (Sudan)

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Melut Basin is one of the extensional basins directed NW-SE in south Sudan, created by the effect of the extensional force of the Africa regional tectonics, these tectonics create an obvious basin structures and large scale of sedimentation processes through three tectonic evolutions (phases), this scenario was playing through different environments associated with geological events, the most important one started in the Lower Cretaceous with a large distribution of lakes to settle a lacustrine sediments, this sedimentation phase was dominated with by high total organic shale with some continental materials, the organic shale developed through the geological time and placed within the generation window to form a potential hydrocarbon source.

The presence of the Source rock was confirmed by simple and advanced geochemical analysis conducted on the drilled wells, and the hydrocarbon expulsion efficiency was tested by the 1D thermal modeling tools, (Genex, Temis 1D and Petromod 1D).

Characterization of The petroleum system elements in south Melut sub basin (S.M.S.B), represent a major exploration challenge in the basin. The degree of efficiency of the petroleum system machine in this part of Melut basin need more advance discussion and sharing ideas.

The 3D basin modeling was conducted to evaluate the whole Melut basin concentrating in the southern part of basin due to the dryness of some wells on it, it conducted utilizing Temis 3D with the Full Darcy migration pathways evaluation run. Seven selective 2D sections were extracted from the whole 3D volume of Melut Basin to evaluate the petroleum system elements and to ensure the hydrocarbon generation and expulsion efficiency and to evaluate the physical properties capability to avail a good migration media for the generated hydrocarbon to reach the reservoir strata.

All the available data was utilized (recorded thermal data, formation pressure data, Lithology data, stratigraphic data, geochemical analysis results and Basement thermal data).